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ABSTRACT

This task force report considers strategies designed to elicit active participation on the part of severely multihandicapped students. The first section considers ways to gather information on environments and daily activities of severely multihandicapped students. Hypothetical daily home and vocational routines were composed and estimates made of daily time spent on the tasks. The next section examines skills required of severely multihandicapped students and the degree to which he/she can perform them. Ecological inventories are described which allow for prioritization of instructional targets and the use of partial response descriptors. The final section addresses ways to arrange instruction to ensure active participation through contextual rather than isolated instruction, small group rather than one-to-one instruction, conditional rather than unconditional assistance, heterogeneous versus homogeneous groupings, and predictable rather than unpredictable features of the schedule and structural arrangement. Appended are a parent participation guide, and an "ecological inventory" based on observations of children's behavior when playing with a remote control car. (CL)

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# ARRANGING INSTRUCTION TO ENSURE THE ACTIVE PARTICIPATION OF SEVERELY MULTIHANDICAPPED STUDENTS

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# I. INTRODUCTION

Basic to the educational goals of all students is the acquisition of skills that enable greater access to a variety of environments. For a severely multihandicapped student, that is, a student whose learning difficulties are attributed to severe mental retardation as well as pronounced motoric, sensorial, and/or health-related difficulties,[3] the skills necessary to enable greater environmental access are only vaguely understood. If, as educators, we are to acquire a better understanding of these skills, strategies are needed that result in explicit information about: a) the skills required to function in a variety of individually relevant environments; b) the degree to which a severely multihandicapped student can perform the required skills; and c) how intervention should be arranged to ensure active participation by that student in the environments of concern.

In September of 1981, a task force was organized for the purpose of developing curricular strategies that might assist those responsible for the educational programs of severely multihandicapped students. The strategies presented in this paper are based on the notion that, although a severely multihandicapped student may exhibit many forms of behavior that compete or interfere with the independent performance of many skills, partial responses can be elicited through instruction which would allow a student greater control.

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[3] Such pronounced difficulties may include:

A Lack of Necessary Motor Skills as evidenced by limited mobility; limited ability to reach, touch, and manipulate objects within close proximity, limited ability to position oneself for optimal learning; etc.;

The Presence of Abnormal or Primitive Bodily Posture and Movement as evidenced by asymmetrical tonic neck reflex, symmetrical tonic neck reflex, tongue thrust, etc.;

Sensory Modalities that are Weak or Nonfunctional as evidenced by impaired vision and/or hearing, tactile defensiveness; etc.; and/or

Special Health Conditions as evidenced by seizure activity, side effects of medication, upper respiratory problems, etc.

## II. ENVIRONMENTS AND ACTIVITIES OF RELEVANCE TO A SEVERELY MULTIHANDICAPPED STUDENT

If we were to examine the daily routine of a ten-year-old severely multihandicapped student and compare it to a nonhandicapped student of the same chronological age, it is highly probable that few structural differences in their routines would be noted. For example, consider the following information provided by a parent who discusses the daily routine of her ten-year-old son:

> I wake Joe at 6:45 a.m. Joe uses the bathroom, gets dressed and eats breakfast. At 7:45 a.m. Joe catches the school bus. At 3:10 p.m. Joe returns from school at which time he usually has a snack. He occupies his time before dinner by watching T.V., playing a game, listening to music, and playing outside. At 5:30 p.m. the family eats dinner. Sometimes after dinner Joe is expected to help with clean-up activities such as unloading the dishwasher. He then goes down to the family room where he watches T.V. or plays games with his father or brother. At 7:30 p.m. he takes a bath. On a school night he is in bed at 8:30 p.m. Occasionally on a weekday, but more often on a weekend, Joe goes shopping and out to eat with the family. Also on Sunday morning he attends church.

This information was provided by a parent of a ten-year-old severely multihandicapped student. Yet the activities that comprise this student's daily routine could easily characterize the routines of many of his nonhandicapped peers.

Although the manner in which Joe and his nonhandicapped peers participate in routine activities may differ substantially, the basic skills required to engage in these activities may not necessarily vary. Getting dressed in the morning requires that an individual reach for a clothing item such as pants, undo fasteners that may interfere with dressing, position the pants so that one leg can be placed into the correct opening, etc. The performance of these basic skills is necessary regardless of handicapping conditions. The fact that a severely multihandicapped student may be motorically incapable of putting on a pair of pants does not make this daily requirement any less real for him/her. That is, if the severely multihandicapped student does not "position the pants so that one leg can be placed in the correct opening," then someone else will have to do it for him/her.[4]

### A. Environments and Activities of Immediate Relevance

Most would agree that a major goal of education is to provide a student with skills that will enable greater access to the environments in which he/she currently functions and those in which he may function

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[4]Brown (Note 1) has suggested that the following question be asked to evaluate the functionality of a skill: "If the student does not do it, will someone have to do it for him/her?"

in the future. In order to accomplish this goal, information must be gathered pertaining to these environments and activities. A Parent Participation Guide, presented in Appendix A, was designed for this purpose. Section II of this guide entitled, "Activities of a Typical Weekday and Weekend", requests that parents actually record the places, activities and persons that characterize the before and after school hours and weekend life space of their severely multihandicapped child. Section III, entitled "A Parent Attitudinal Checklist," is designed to secure information from parents concerning the kind and degree of participation their child may have when engaging in a given activity. A parent is asked to indicate the responses that most aptly describe his/her feelings across a variety of activities that occur in Domestic, Community, Recreation/Leisure and Vocational environments. The responses include:

> This activity is very frustrating for me and/or for my child;
>
> It is much easier, and always will be easier, if I do this activity for my child;
>
> I would like to see this activity included in my child's IEP; and
>
> If the school would work on the activity, I would try to involve my child in the activity, even if he/she could not do it independently.

The activities listed in the guide were selected because of their perceived relevance in the daily routines of most students. By their very nature, many of the domestic-related activities require some level of participation. Undressing, dressing, bathing, caring for teeth, and eating all require actions that, "If a severely multihandicapped student does not do them, he/she will at least have to allow someone else to do them to him/her." For example, if the arm of a student is not sufficiently relaxed while dressing, he/she may have little choice but to participate in the relaxation techniques that ultimately allow the sleeve of a sweater to be maneuvered over his/her arm. In other words, he/she will be "acted upon".

Other activities listed in the guide require actions that "If a severely multihandicapped student does not do them, someone else will have to do them for the student." Examples of these activities include, picking up clothes, putting away games or toys, clearing the table after a meal and purchasing a desired item in a department store.

Finally, the guide includes activities requiring skills that "If the severely multihandicapped student does not do them, he/she will experience an inordinate amount of 'dead time'".[5] Performing the skills

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[5]The term "dead time" is used to refer to the amount of time available to a person during which few if any actions are required and during which a person engages in maladaptive/inappropriate or counterproductive actions.

necessary to engage in recreation/leisure and vocational activities fall into this category.

B. Environments and Activities of Post-School Relevance

It we consider our instructional efforts preparatory, then we are obligated to make our best projections as to the environments and activities that should comprise the life space of a severely multihandicapped student in adulthood. Thus the following question was posed to thirteen teachers and therapists: "What are your best projections for the activities or routines in which the severely multihandicapped students with whom you work will be actively involved upon graduation?" In response to this question, a hypothetical daily schedule of a graduate was generated. Estimated times were ascribed to each of the routines listed in the schedule; e.g., the estimated time for a morning routine was one hour and forty-five minutes. Since a severely multihandicapped adult might be expected to be awake at least fifteen hours a day, the percentage of waking hours was calculated for each routine in terms of a fifteen hour day. The initial projections offered by staff members are presented in the hypothetical schedule depicted in Table 1. The projected activities were primarily domestic in nature. Furthermore, upon calculating the estimated times that corresponded to the domestic activities, we discovered that only 49% of the waking hours was accounted for in these projections. The obvious question that evolved from this exercise was, "What will this person do during the remaining fifty-one percent of the time or eight hours per day?"

It is important to stress that the activities listed in Table 1 represent initial projections by the staff surveyed. Upon examining this hypothetical schedule of a severely multihandicapped graduate, many unsettling observations were made which eventually served to alter the initial projections. First, the projections lacked recreation/leisure activities. In order to reduce dead time, the task force readily resolved that a severely multihandicapped student should be taught to occupy free time by engaging in single person or small group recreation/leisure activities.

Second, all of the activities listed in Table 1 occurred in one environment, home. This confinement to one environment was viewed as unduly restrictive. Most felt that the limited range of stimulation that could be derived from one environment would surely have a negative effect on responsiveness. Undoubtedly a severely multihandicapped individual would benefit greatly from engaging in activities such as:

a) walking or "wheeling" around the neighborhood, mall, and the city park;

b) seeing a movie;

c) going to the library;

d) swimming at the YMCA;

## Table 1

## A Hypothetical Daily Schedule of a Severely Multihandicapped Graduate

| Projected Environment and Activities | Estimated Amount of Time Involved in the Activity | Percentage of Fifteen Waking Hours |
|---|---|---|
| Home | | |
| A. Morning Routine<br>1. Using the toilet<br>2. Personal grooming<br>(a) washing hands and face<br>(b) brushing hair<br>(c) brushing teeth<br>3. Undressing/dressing<br>4. Eating breakfast<br>5. Cleaning up after breakfast (e.g., wiping off tray, clearing table) | A. 6:00-7:45 a.m. (1 hour and 45 minutes) | A. 12% |
| B. An Exercise Routine | B. 7:45-8:00 a.m. (15 minutes) | B. 2% |
| C. (No Activity Projected) | C. 8:00-9:30 a.m. (1 hour and 30 minutes) | C. - |
| D. A Break or Snack Routine<br>1. Preparing a snack<br>2. Eating a snack<br>3. Cleaning up after a snack | D. 9:30-10:30 a.m. | D. 7% |
| E. (No Activity Projected) | E. 10:30-12:00 (1 hour and 30 minutes) | E. - |
| F. A Lunch Routine<br>1. Eating lunch<br>2. Cleaning up after lunch | F. 12:00-1:15 p.m. (1 hour and 15 minutes) | F. 8% |
| G. (No Activity Projected) | G. 1:15-3:00 p.m. (1 hour and 45 minutes) | G. - |
| H. (No Activity Projected) | H. 3:00-5:00 p.m. (2 hours) | H. - |
| I. A Dinner Routine<br>1. Eating dinner<br>2. Cleaning up after dinner | I. 5:00-6:30 p.m. (1 hour and 30 minutes) | I. 10% |
| J. (No Activity Projected) | J. 6:30-7:45 p.m. (1 hour and 15 minutes) | J. - |
| K. An Exercise Routine | K. 7:45-8:00 p.m. (15 minutes) | K. 2% |
| L. A Bedtime Routine<br>1. Removing clothing and putting away<br>2. Using the toilet<br>3. Engaging in grooming activities<br>(a) bathing<br>(b) brushing teeth<br>4. Putting on sleepwear | L. 8:00-9:15 p.m. (1 hour and 15 minutes) | L. 8% |
| Total waking hours accounted for per day | 7 hours and 30 minutes | 49% |

e) participation in events coordinated by community recreation programs; and

f) eating at restaurants.

Finally, an obvious omission from the hypothetical schedule was a vocational routine. A daily vocational routine would provide a severely multihandicapped adult with a purpose for leaving the house each day and an opportunity to contribute to the general work efforts that are so valued by our society. Few would question the benefits that can be accrued from a daily work experience. Many, however, would point to the amount of intense intervention that may be required and the minimal production that would reasonably be expected of a severely multihandicapped student. However, vocational training must not be rejected on such bases. A severely multihandicapped adult who requires intense intervention to engage in a vocational activity would most likely require a similar degree in domestic, recreation/leisure and community activities. Surely, the staff-to-adult ratio for providing instruction in those other areas can also be applied at a work site. Furthermore, if a worker is compensated according to what he/she produces, then production limitations need not be used as a rationale for exclusion.

Still, some might suggest that a vocational routine is not a priority given the other needs of a severely multihandicapped adult. This position appears reasonable, until the actual amount of time in which an adult is not occupied in domestic activities and the estimated amount of time that he/she can reasonably be expected to engage in recreation/leisure activities are determined.

In summary, in our attempts to understand the immediate needs of a severely multihandicapped student, we must recognize that every day he/she will be expected to perform many routine functions such as washing his/her face and hands, dressing appropriately, eating meals, and getting to and from school. When projecting postschool needs, "the least dangerous assumption" should be made (Donnellan, Note 2). That is, let us assume that a severely multihandicapped student will have the opportunity to participate in those environments and activities generally available to his/her less handicapped and nonhandicapped peers. The question of educational importance then becomes: To what degree will he/she become an active participant in these environments and activities?

## III. THE DEGREE TO WHICH A SEVERELY MULTIHANDICAPPED STUDENT CAN PERFORM THE SKILLS REQUIRED IN A SELECT ENVIRONMENT

One promising way to arrange for more active participation in a specific activity is to generate individualized adaptations appropriate for the student-activity relationship. That is, if an individual severely handicapped student cannot perform a particular skill due to its motoric, communicative, visual, etc. components, an adaptation might be created to allow for more active participation.

Significant efforts have been made to maximize the performance of severely multihandicapped students through the use of adaptive devices. Barnes, Murphy, Waldo and Sailor (1979) have described a variety of adaptive equipment that can be used to enhance a student's self-help and communication skills such as building up the handle of a spoon with sponge rubber to facilitate grasp and attaching cardboard or plywood response panels to a lap tray to facilitate more distinct communicative movements. Many severely multihandicapped students are now able to perform skills once considered beyond their physical abilities due to commercially available and teacher-made switches and other adaptations (Burkhart, 1980, 1982; Holt, Buelow & Vanderheiden, 1978). The reader interested in strategies for generating a variety of individualized adaptations is referred to Baumgart, Brown, Pumpian, Nisbet, Ford, Sweet, Messina and Schroeder (1982).

Regardless of the proficiency of a severely multihandicapped student in the use of adaptive devices, such devices rarely account for all of the skills necessary to become an active participant in the activity of concern. For example, a student who uses a switch box to operate a cassette tape player, may still need others for assistance when securing the equipment and putting in and ejecting the cassette. Thus, for a student to become as actively involved as possible in the entire activity, it is important to target not only those skills that a student can learn to perform independently but also those that can be used to influence "what", "when" and "how" assistance is provided. Before such skills can be targeted, attempts must be made, first, to determine all the skills required of a severely multihandicapped student while engaging in an activity and second, to determine the degree to which he/she can perform the required skills.

### A. The Skills Required of a Severely Multihandicapped Student

The demands of an environment do not necessarily change because the person functioning in that environment is severely multihandicapped. The waiter at McDonald's is still going to ask for an order. The faucets in the shower room at the YMCA will still need to be manipulated to spray water. A selector on a vending machine will still have to be pressed to release a soda. Thus information is needed about the skills typically required to function in a particular environment.

One strategy for determining the skills required to initiate, proceed through, and terminate an activity in a select environment has been

termed "an ecological inventory" (Brown, Falvey, Vincent, Kaye, Johnson, Ferrara-Parrish, & Gruenewald, 1980). This involves: 1) entering a select environment; and 2) recording the observed step-by-step performances of nonhandicapped individuals as they engage in the specific activity of concern.

For this strategy to be considered a valid indicator of the skills required of a severely multihandicapped student, adjustments must be made which reflect his/her motor, sensory and/or health-related difficulties. For example, an observation recorded as "walks to the entrance" might be delineated as "wheels to the entrance". A segment of an ecological inventory that was adapted to reflect the unique physical characteristics of a severely multihandicapped student is presented in Figure 1. The skills listed were performed by nonhandicapped students who were consuming a snack at a sit-down restaurant. The underlined words represent descriptions of performances that were rephrased to reflect the behavior that might be expected of a nonambulatory student.

By conducting an ecological inventory such as the one presented in Figure 1 a teacher can: 1) ascertain the actual skills required to engage in a particular activity; and 2) prepare a criterion-referenced assessment tool from which the performance of a severely multihandicapped student can be measured. The performance characteristics of a severely multihandicapped student can then be assessed and compared to the performance displayed by persons who generally function in a particular environment. The skills "missing" from the repertoire of a severely multihandicapped student can be analyzed and targeted for instruction. This assessment tool is referred to here and elsewhere as a "Discrepancy Analysis Strategy" (Brown, et al., 1980; Ford, Brown, Pumpian, Baumgart, Nisbet, Schroeder & Loomis, 1982).

Upon analyzing the discrepancies between the performance required in a select environment and that exhibited by the severely multihandicapped student, determinations of "what to teach" can be made. However, such determinations may not be possible if the discrepancy analysis does not provide sufficiently detailed information. Consider, for example, the discrepancy analysis presented in Figure 2. In its current form, this discrepancy analysis offers very little information about the degree to which the severely multihandicapped student could perform the skills necessary "to eat a snack with a friend at Big Boy Restaurant." At least two factors serve to minimize the instructional value of this particular analysis. First, the skills listed in the ecological inventory are much too broad to allow for a ready comparison of the skills displayed by the severely multihandicapped student; e.g., "Orders food upon request of waiter" and "Eats and drinks with appropriate manners". Second, the performance of the severely multihandicapped student was described in terms of teacher behavior rather than student behavior.

To improve the instructional value of this discrepancy analysis, the specific skills listed in the ecological inventory must be targeted and broken down into measurable components and the responses of a severely multihandicapped student (rather than those made by the teacher) must be described.

Environment: Big Boy Restaurant

Activity: Eating a Snack With a Friend

Skills:

Locating the restaurant

1. Transfers from a car to wheelchair
2. Wheels to the entrance of the mall
3. Opens the door
4. Wheels to the restaurant, socializes with a friend
5. Stops at the entrance to the restaurant

Locating an Empty Booth

6. Opens the door
7. Wheels to the seating area and scans the area for an empty booth
8. Wheels to an empty booth with a friend
9. Positions self at the table
10. Removes coat
11. Removes menu from holder
12. Examines the appropriate section of the menu
13. Selects desired item
14. Determines affordability

Ordering Food

15. Socializes while waiting for a waiter/waitress to approach
16. Acknowledges the presence of the waiter
17. Orders food upon the request of a waiter
18. Replaces menu

Eating and Drinking Food

19. Acknowledges the receipt of an appropriate food item
20. Picks up the necessary utensils, condiments, etc.
21. Eats and drinks with appropriate manners

Terminates the Activity

22. Acknowledges the receipt of check
23. Reads the check
24. Indicates to his friend a desire to leave
25. Puts on coat
26. Leaves a tip
27. Pays the check at the appropriate counter
28. Wheels to the exit

Figure 1. An ecological inventory adapted for a nonambulatory student

Environment: Big Boy Restaurant

Activity: Eating a Snack With a Friend

| An Ecological Inventory Adapted for a Nonambulatory Student | Severely Multi-Handicapped Student Inventory: James | Adaptation Hypothesis |
|---|---|---|
| **LOCATING THE RESTAURANT** | | |
| 1. Transfers from a car to wheelchair | 1. Teacher assisted | |
| 2. Wheels to the entrance of the mall | 2. Teacher pushed the chair | |
| 3. Opens the door | 3. Teacher opened the door | |
| 4. Wheels to the restaurant, socializes with a friend | 4. Teacher pushed the chair | |
| 5. Stops at the entrance to the restaurant | 5. Teacher stopped the chair | |
| **LOCATING AN EMPTY BOOTH** | | |
| 6. Opens the door | 6. Teacher opened the door | |
| 7. Wheels to seating area and scans the area for an empty booth | 7. Chair was pushed by the teacher | |
| 8. Wheels to an empty booth with a friend | 8. Chair was pushed by the teacher | |
| 9. Positions self at the table | 9. Teacher positioned James | |
| 10. Removes coat | 10. Teacher assisted | |
| 11. Removes menu from holder | 11. Teacher assisted | |
| 12. Examines the appropriate section of the menu | 12. Teacher planned to order for James | 12. A menu card could be used with graphic symbols |
| 13. Selects desired item | 13. Item was preselected by teacher | |
| 14. Determines affordability | 14. A determination was made by teacher | 14. The money could be placed in a pocket which is attached to the ordering device |
| 15. Socializes while waiting for a waiter/ress to approach | 15. No social contacts were made between James and his classmate | |
| 16. Responds to the presence of the waiter | 16. Did not orient to waitress | |
| 17. Orders food upon the request of a waiter | 17. Teacher ordered a "Diet Pepsi" and French fries for James | |
| 18. Replaces menu | 18. Not applicable | |
| **EATING AND DRINKING FOOD** | | |
| 19. Acknowledges the receipt of an appropriate food item | 19. James tracked food items as they were placed on the table | |
| 20. Picks up the necessary utensils, condiments, etc. | 20. Teacher obtained the materials | 20. The cup from school can be used here |
| 21. Eats and drinks with appropriate manners | 21. Teacher assisted | |
| **TERMINATES THE ACTIVITY** | | |
| 22. Acknowledges the receipt of check | 22. James did not look in the direction of check | |
| 23. Reads the check | 23. Not applicable | |
| 24. Indicates to his friend a desire to leave | 24. Teacher assisted | |
| 25. Puts on coat | 25. Teacher assisted | |
| 26. Leaves a tip | 26. Teacher left a tip | |
| 27. Pays the check at the appropriate counter | 27. Teacher paid the check | |
| 28. Wheels to the exit | 28. Teacher wheeled James out of the restaurant | |

Figure 2. A Discrepancy Analysis of Minimal Instructional Value

B. Instructional Targets

Imagine the cumbersome analysis that would result from breaking down each skill in the restaurant sequence to permit a ready comparison of the behavior of a severely multihandicapped student and the requirements of "eating a snack in the restaurant". For example, the skill "orders food upon request" might be analyzed as follows:

1. Removes card with a graphic display of predetermined order from the side pouch of his wheelchair
    a. reaches with left hand across body to the pouch (located on the right side of chair)
    b. touches pouch
    c. reaches inside
    d. touches card
    e. grasps card
    f. lifts card from pouch
    g. moves hand from pouch to table while grasping card
    h. places card on table in front of body (position of card does not matter since both sides have the same message)
    i. releases grasp
2. Orients upper body and head in the direction of waiter
3. Smiles to indicate readiness to order
4. Upon cue from waiter, touches card with a graphic display of order
    a. reaches for card
    b. touches card
    c. lifts hand
    d. moves hand away from card

Conceivably, similar analyses could be conducted for all skills listed in the discrepancy analysis presented in Figure 2. Undoubtedly such an expansive skill analysis would allow the observer to obtain a more precise record of the performance of a severely multihandicapped student. However, an expansive analysis of this nature can become unmanageable. Consequently, it may make more instructional sense to determine the skills which will become the targets for instruction and

begin by delineating those into measurable components. Thus, for the example provided in Figure 2, a teacher may decide to target the following skills:

#1. Transfers from a car to wheelchair;

#5. Stops at the entrance to the restaurant;

#10. Removes coat;

#13. Selects desired food item;

#17. Orders food upon the request of a waiter;

#19. Acknowledges that the appropriate food item was received;

#21. Eats and drinks with appropriate manners; and

#25. Puts on coat.

Some of the factors considered when selecting instructional targets from the discrepancy analysis provided in Figure 2 are listed and described briefly below.

Transfers from a car to wheelchair. James transfers to and from his chair and vehicles many times throughout the day. Given the frequency at which these transfer skills are likely to be required both now and in the future it seems appropriate to target these for instruction. Furthermore, as James becomes more active in this transfer process, less involvement may be required of caregivers. For example, one critical part of active transferring is to bear weight through legs and feet and to shift weight on cue from the person assisting. This is certainly more active than being lifted from one vehicle and placed in another.

Stops at the entrance to the restaurant. A teacher may decide that it is unreasonable to expect James to maneuver his wheelchair the length of the hallway of the shopping center to the entrance of the restaurant. Because James does not have the physical ability to maneuver his one-arm drive chair for this distance, he is often pushed the entire way. When this happens, however, he is denied at least two learning opportunities. One is the opportunity to improve his wheeling skills in a meaningful context; and another is the opportunity to acquire the skill of discriminating between the entrance of the Big Boy Restaurant and adjacent store entrances. It is difficult, if not impossible, for James to demonstrate these discrimination skills when the teacher determines when to stop the chair. Thus this skill might be selected for instructional emphasis for two reasons: to allow James an opportunity to develop the motoric skills necessary to maneuver his wheelchair; and to develop discriminative responses that can serve to influence the actions of others. For example,

James might be expected to wheel only ten feet at a time instead of the entire distance. This instruction could be arranged to enable him to make a discriminative response by stopping his chair and orienting his body in the direction of the restaurant as opposed to the other store entrances adjacent to the restaurant.

Removes coat. This is a skill area that occurs routinely across a variety of environments and activities. Since James will be expected to participate to some degree in removing his coat, why not maximize his involvement?

Selects desired food item. This skill was selected because it establishes a primary motivational source for engaging in the activity. Imagine eating out with a friend and allowing this friend to order for you. Imagine further that this friend orders your least preferred item on the menu and, in fact, each time you eat out with this friend your food preferences continue to be ignored. What effect is this likely to have on your motivation to eat in that particular restaurant with this friend? To deemphasize the choice aspects of the restaurant skill sequence, is to minimize the intrinsically reinforcing qualities of the experience. Although it may take a great amount of time and trials to determine the food preferences of a severely multihandicapped student, the benefits of a student acquiring the skills to exercise a choice would far exceed the educational investment.

Orders food upon the request of a waiter. This skill was selected because of its social interactive requirements. This is one of the few skills in the restaurant sequence that requires the valued interaction between James and a nonhandicapped person functioning in that environment. James could learn that the presentation of a card with the bowl-shaped symbol results in "something to eat". To perform this skill, he need not be aware that the label "French fries", printed at the top of the symbol, communicates to the waiter the exact nature of his request. Without this communication card, it is likely that the food would be ordered for him and little or no interaction would occur between the waiter and James.

Acknowledges that the appropriate food item was received. "To acknowledge that the appropriate food item was received" requires recall of what was ordered and recognition of whether that order is fulfilled. For James, the development of such memory skills may be an unreasonable expectation at this point in time. Thus an adaptation might be created, allowing him to match a picture of French fries with the actual food item. These symbolic representation skills may also be viewed as unreasonable expectations. Then, on what basis was this skill selected for instructional emphasis? The rationale is two-fold. First, it provides James with another opportunity to interact with the waiter. He could learn to look up and smile at the waiter while being served. This social gesture is likely to leave the waiter with a much more favorable impression than if he were to have his head down for the duration of the interaction. Second, the last skill targeted was "orders food upon request.", Thus, James will have experienced a substantial

break during which no environmentally-determined responses were required. Here, the spacing of instructional trials was taken into account when determining that enough of a break period occurred before instruction in another target area was warranted.

Eats and drinks with appropriate manners. A mealtime program has been developed for use with James in school and at home. These skills of life sustaining value are no less important because they occur in restaurant settings. Hence, the skill analysis that has been designed by an occupational therapist for use at school and home should also be applied in the restaurant setting. A partial listing of this analysis which specifically addresses the skills required "to eat finger foods" is presented below:

1. Reaches for food item, e.g., a French fry, with shoulders forward during reach
2. Touches food
3. Grasps food in hand
   a. Wrist is in neutral position
   b. Fingers and thumb are open during reach for food
4. Holds food item as lifts off plate
5. Bends elbow bringing hand to mouth
6. Turns palm inward
7. Moves elbow upward and away from the body as the hand is brought to the mouth.
8. Moves head slightly forward
9. Keeps body parts still, other than arm and hand during hand to mouth pattern
10. Brings hand to mouth
11. Opens mouth smoothly to receive food with jaw dropping open in controlled manner

Puts on coat. Like the skill area of "removes coat", the skills required to "put on coat" occur routinely across a variety of environments and activities and James has no choice but to participate to some degree.

Just as there are factors that can lead to the emphasis of select skills, there are reasons that can be offered to deemphasize a particular skill. That is, a decision to deemphasize a particular skill may be based on:

The complexity of the skill; e.g., The skill, "leaves a tip" might be considered less of a priority given the complex nature of the action.

The fatigue of the student; e.g., Instructional emphasis might be placed on having James "transfer from a car to his wheelchair", and, due to the fatigue that results from this instruction, a decision might be made to delay emphasis on the transfer from his chair to the booth in the restaurant which would occur only minutes later.

An adaptation which may eliminate the need to perform the skill; e.g., The skill, "examines the appropriate section of the menu" is not necessarily required to complete the restaurant skill sequence. An order that had been predetermined would eliminate the need to refer to the menu.

In summary, there are many factors to consider when selecting the skills that will become instructional targets for a severely multi-handicapped student in a given skill sequence. None of these factors should be offered as the sole basis upon which to select a skill. Instead, these factors should be considered comprehensively, with other factors, to enable the careful selection of instructional targets and, thus, more purposeful interventions. Below is a series of questions capsulizing these factors:

Will performance of this skill occur frequently and on a routine basis?

Will this skill occur across a variety of environments and activities?

Will performance of this skill result in less involvement by caregivers?

Will performance of this skill allow a student to further develop motoric, sensorial and communicative functioning?

Will performance of this skill allow a student to influence the actions of others?

Will performance of this skill help to establish a primary motivational source for engaging in the activity?

Will performance of this skill require that a student interact socially with a nonhandicapped and/or handicapped individual?

Will performance of this skill enhance the development of a life sustaining function?

C. Descriptors of Partial Responses

Descriptions of the responses by a severely multihandicapped student must account for the motoric, sensorial, behavioral and health-related difficulties that may be experienced. Since such difficulties may interfere with complete and independent responses, we must be prepared to describe partial responses. Because partial responses are often difficult to describe, there may be a tendency to record teacher behavior rather than student behavior. Responses such as "teacher assisted", "the teacher wheeled him to the table", "the teacher provided a physical prompt" offer very little information about what the student can do; they simply establish the fact that the skill was not performed independently. When teacher behavior is used to describe the performances of a student it is difficult, if not impossible, to ascertain the extent to which a student has participated or is making progress.

A list of partial response descriptors is provided in Figure 4. These are organized under the following headings: Body Movements, Eye Movements, Facial Expressions, and Vocalizations. Descriptors can be used to characterize responses that are both productive and counterproductive depending on the context in which they are exhibited and the information desired. For example, the response "turns upper body away from cue" can be viewed as counterproductive when a student is to place her hand in the sleeve of a jacket. On the other hand, "turning her upper body away" to avoid the direct impact of a ball at recess might be viewed as a very appropriate response. Finally, qualifiers which may be pertinent to each category are listed. For example, the descriptor "reach" may be used to describe an action performed by a student. Supplementary information regarding "range of motion" and "latency" may clarify how "reaching" was performed.

Neither the list nor the categories guide is exhaustive. Hopefully, the descriptors presented in Figure 3 will provide a useful reference when breaking down the instructional target, "ordering food in a sit-down restaurant". Descriptors of partial responses may enable a ready assessment of the performance displayed by a severely multihandicapped student in the restaurant. Unlike the previous example of discrepancy analysis in which performance was described in terms of teacher behavior, Figure 4 offers a discrepancy analysis which describes what the student "did" and "did not" do. That is, instead of only knowing that James relied on "teacher assistance" to remove the card from the side pouch of his wheelchair, we now know that James had difficulty: 1) initiating the sequence of actions necessary to remove his communication card; 2) reaching across midline (suggesting the position of the pouch might be changed); 3) maintaining grasp; and 4) placing the card in front of him in preparation to order. Additionally, we know he was able to: 1) touch the pouch; 2) reach inside the pouch; 3) touch the card; and 4) grasp the card. Based on this performance information, we are in a better position to target specific skills and intervene in a systematic and challenging manner.

Thus far, in attempts to acquire a better understanding of the skills necessary to gain greater environmental access, it has been

| | Body Movements | Eye Movements | Facial Expressions | Vocalizations |
|---|---|---|---|---|
| Characterizers | Disengages in self-stimulatory responses<br>Orients upper body/head toward cue<br>Reaches<br>Touches<br>Grasps<br>Lifts<br>Releases<br>Shifts weight<br>Bears weight<br><br>Engages in self-stimulatory responses<br>Turns upper body/head away from cue<br>Puts head down | Orients to visual cue<br>Gazes<br>Fixates<br>Scans and fixates<br>Tracks along specific path | Smiles<br>Grimaces | Laughs<br>Coos<br>Cries<br>Marked inhalation<br>Produces words or word approximations<br>Produces sounds |
| Qualifiers | Latency<br>Duration<br>Range of motion<br>Nature of grasp; i.e., pincer | Latency<br>Duration<br>Range of motion | Latency | Volume<br>Pitch<br>Clarity |

Figure 2. Descriptors of partial responses

| Instructional Targets | Severely Multihandicapped Student Inventory James |
|---|---|
| Orders food upon request | |
| 1. Removes card with a graphic display of the predetermined order from the side pouch of his wheelchair | 1. Latency: 30 seconds, then teacher intervened.<br>Duration: 1 minute and 40 seconds |
| a. reaches across midline | a. (-) did not orient toward card nor could he reach across midline |
| b. touches pouch | b. + |
| c. reaches inside | c. + |
| d. touches card | d. + |
| e. grasps card | e. + |
| f. pulls card from pouch | f. (-) did not maintain grasp |
| g. moves hand from pouch to table while grasping card | g. (-) did not maintain grasp |
| h. places card on table in front of body | h. (-) not volitionally |
| i. releases grasp | i. (-) did not establish a firm enough grasp from which to release |
| 2. Orients upper body and head in the direction of waiter | 2. + |
| 3. Smiles to communicate readiness to order | 3. (-) smiled but his head was down |
| 4. Upon cue from waiter touches card with a graphic display of order | 4. Latency: 20 seconds then teacher intervened. |
| a. reaches for card | a. (-) fixated upon but did not initiate reach |
| b. touches card | b. (+) and vocalized sound |
| c. moves hand away from card | c. (+) |

Figure 4. A discrepancy analysis depicting the assessment of partial responses.

concluded that the environments and activities in which a severely multihandicapped student functions do not differ significantly from those experienced by less handicapped or nonhandicapped peers. Further, the prioritization of instructional targets and the use of partial response descriptors to gain explicit information about the degree to which a student performs the skills required in a select environment have been discussed. Now, arranging instruction to ensure active participation in the environments of concern must be addressed.

## IV. ARRANGING INSTRUCTION TO ENSURE ACTIVE PARTICIPATION

Sarah, eleven, was met at the bus and wheeled directly to the classroom. The contents of the bag attached to the back of her wheelchair were emptied by the instructional aide. These included a change of clothing and a notebook of daily written communication between the teacher and Sarah's parents. Sarah sat near the doorway while the aide read the notes and placed her extra clothing in the changing room. She continued to wait while the aide and teacher went to assist her classmates off the bus. Sarah was not sure which of her classmates had already arrived because her chair was left facing the wall.

After all the students arrived in their wheelchairs, Sarah was pushed down the hall to her locker. She wasn't sure who was pushing her. Sometimes the instructional aide, other times her teacher would wheel her to her locker. Sarah's jacket was removed and placed in the locker. She was then wheeled to the bathroom where she was lifted and placed on the toilet especially adapted for her. The stall door remained open while the teacher left to assist another student in the hallway. Sarah urinated, but because she was strapped onto her toilet seat and required assistance to transfer back to her chair, she had to wait for the teacher to return. Five minutes later the teacher returned, reinforced Sarah and assisted her in the transfer back to the wheelchair. Sometimes Sarah was expected to participate in washing her hands, but on that day the teacher must have been in a hurry because the "hand washing" activity did not occur.

Sarah was pushed back to the classroom where she waited for the rest of her classmates to finish the bathrooming routine. No objects of interest were placed within her reach so she rocked her body and flicked her fingers in front of her face. Finally, when all students were present, Sarah was transferred from the chair to a floor mat. Sarah lay on the mat while the student teacher secured a bolster. She was then lifted and positioned on the mat. The teacher and the student teacher moved around the circle, shook hands and said hello to each student.

Sarah waited as the teacher discussed the next event with the instructional aide and student teacher: "Why don't you work with Jose today on communication? The physical therapist will be in to work with Sue. I'll take Allan to do range of motion with him." While others received one-to-one instruction, Sarah was expected to play with the electronic game, "Simon". Sarah made several attempts to press the panels to hear the sounds, but not more than two minutes after the game was placed in front of her, it was unintentionally pushed out of her reach. Each attempt to reach for the game moved her body into a more inappropriate position.

Fifteen minutes later Sarah was lifted from the mat and placed into her chair. It was now her turn to receive one-to-one instruction with the teacher. Earlier that week, during her one-to-one session, Sarah worked on brushing her teeth. On that day she performed skills related to zipping and unzipping. She practiced grasping a large ring fastened to a zipper attached to a board. Although this adaptation facilitated her response during this session, it was not fastened to her jacket which needed to be zipped and unzipped routinely throughout the day. Following this session, Sarah received more one-to-one instruction. She and an instructional aide worked on "tracking and scanning skills". After another free time period, the student teacher took Sarah to the bathroom. On the way to the bathroom, Sarah flinched at the sound of a loud noise which came from behind. She never did find out what created that sound. Although the student teacher turned and took notice of the distraction, Sarah's chair was not moved to enable her to view the source of the loud distraction.

How much control did Sarah have over the environment? To what degree did instructional factors influence her response patterns? At least several observations can be made regarding instructional factors that served to elicit passive rather than active participation.

Many of the most routine and functional activities that Sarah encountered were not targeted as opportunities for instruction. For example, Sarah sat passively as her jacket was removed and placed in her locker. Yet later in the day, out of context, she was expected to practice zipping and unzipping, using an adaptation not available when she needed it.

Many times Sarah was pushed in her chair with no information provided to let her know who was pushing her, where she was going and for what reasons.

At no time could Sarah anticipate the skills that were to be required of her next. Some days she worked on brushing her hair. Some days she was expected to wash her hands in the bathroom. Some days she received instruction from her teacher on brushing hair, other days it was the student teacher who provided the instruction. Yet, other days...

Much of the time, Sarah was expected to wait for her turn. While others received one-to-one instruction she was provided with a game that within minutes was out of her reach. On other occasions, when Sarah was afforded free time she had nothing appropriate within reach to manipulate.

Consider an instructional environment characterized by: a series of isolated instructional sessions; one-to-one instruction that creates an inordinate amount of "dead time" for those not directly involved; inconsistent expectations of staff; teacher determinations made independent of any student preferences or input; and a general unpredictability of events. What is the likelihood that a severely multihandicapped

student will become an active participant in the activities that comprise his/her daily schedule? These instructional factors can be manipulated so as to elicit more active student participation.

A. Contextual Versus Isolated Instruction

> Many of the most routine and functional activities Sarah encountered were not targeted as opportunities for instruction...

Whereas isolated instruction can be carried out in many ways, there are two versions that seem worthy of mention here. The first involves instruction during which no attempt is made to present information within a meaningful sequence of skills. This version of isolated instruction usually evolves from a decision to teach a skill such as "to visually track an object". It is not until after the skill "to visually track" has been identified, that the activities are selected. For example, the emphasis of a fifteen minute session might be on "tracking skills". During one session a stuffed animal might be placed in front of the student and moved at eye level from left to right. During another session, a cup might be used or a flashlight. This type of instruction is considered isolated in that the student is not learning to participate in the sequence of skills necessary to engage in the activities of "playing with the stuffed animal" or "functionally using a cup or flashlight". The activities are secondary to the instruction. They are created to teach the student to perform a select skill.

A second version of isolated instruction evolves from a decision to teach the sequence of skills necessary to engage in an activity under conditions different from those the student would naturally experience. Thus, "zipping instruction" was carried out in the classroom as a repeated practice task under artificial conditions. Such isolated instruction usually does not prove to be sound educational practice for severely multihandicapped students in that the skills acquired in isolation rarely transfer to, or facilitate learning in, the contexts of ultimate concern.

In contrast to isolated instruction, contextual instruction evolves from decisions about the environments and activities in which a student functions currently or could function in the future. Students are taught meaningful skill sequences under naturally occurring conditions. For example, with contextual instruction, Sarah would be taught "unzipping" when she arrives at school and has to get her jacket off; and she would receive instruction on "zipping" her jacket when leaving the building. Instead of working on "visually tracking an object" as an isolated skill, this might be one of many skills targeted within the activity of operating a "Thundervette" remote control car which was selected as a recreation/leisure priority for use in home and school environments (see an ecological inventory of "Operating a Thundervette Remote Control Car" in Appendix B).

Many functional contexts embedded within daily school routines are overlooked as opportunities to provide instruction. Probably the

clearest example of this is the "bathrooming routine". Frequently, statements are made about the large percentage of teacher time spent "diapering" and "bathrooming". Almost always the implication is that instructional time is being wasted. "I must spend half of my day in the bathroom" is an exclamation familiar to many teachers of severely multihandicapped students. Yet, if we were to examine the skills required to participate maximally in the "diapering" or "bathrooming" routine and use them as instructional opportunities rather than basic caregiving requirements a truly different interpretation of the context emerges. A student might be taught to perform many of the actions necessary "to put on a clean diaper". For example, she might learn "to maneuver her wheelchair down the hall to the changing room"; "to open the door"; "to secure a diaper from a shelf identified with her name"; "to place the diaper on the changing table", and yes, she might even learn "to open the jar of vasoline with an adapted lid".

Undoubtedly, the effectiveness of contextual instruction depends greatly on the attitude and the preparedness of the teacher. Activities that naturally occur throughout the day must be viewed as prime opportunities for instruction. Extra time must be allotted to provide additional instruction on targeted areas. For example, an extra five minutes might be scheduled for the arrival routine to allow Sarah to receive specific "unzipping" instruction. Carefully planned lessons and data collection procedures should result in the purposeful interventions desired.

This is not to say that educational decisions stemming from concerns about skill development are not justifiable. For example, many severely multihandicapped students do not move their limbs through full ranges during the activities that comprise their daily routines. As a result of this type of disuse, the limbs may atrophy, become contracted, or combinations of both. Therefore it becomes important to arrange times when joints can be moved passively and actively through full range to prevent further disability. In the same respect, the cardiovascular system of a severely multihandicapped student is rarely taxed while engaging in daily routines. Thus time must be planned during which repeated and sustained actions are performed in an attempt to address physiological and health-related needs. However, the emphasis on physical development skills need not be viewed in an isolative manner. Certainly, a context could be established that would serve to enhance the meaningfulness of the instructional session. Music, mats and other decor can contribute to the view of this instructional session as an "exercise class" rather than "a therapy session".

B. Small Group Versus One-to-One Instruction

> Much of the time Sarah was expected to wait for her turn. While others received one-to-one instruction she was provided with a game, that, within minutes was out of her reach...

A one-to-one instructional model has long been regarded as an effective arrangement in which to teach severely multihandicapped students. In part, this stems from the perception that many prompting

procedures used with severely multihandicapped students require one-to-one attention. Thus a teacher might be observed positioning a student to maximize hand usage when activating a switch, stroking an arm to enable reaching for a cup, and molding a student's grasp around a cup to facilitate drinking. For many service providers it is difficult to imagine that such intense and physical prompting procedures may be applied effectively in instructional arrangements other than one-to-one.

Few classrooms are staffed with enough personnel to provide this type of instruction to each student throughout the school day. Typically, if a teacher chooses to provide one-to-one instruction, it is at the expense of other students who are expected to occupy a noninstructional period in a constructive fashion. This expectation is unreasonable for most severely multihandicapped students. In addition to lacking the skills necessary to occupy free time in a constructive fashion, when left alone, many students engage in counterproductive behavior; e.g., body rocking, tongue thrusting, and moving their bodies into inappropriate positions.

Ranieri, Ford, Vincent and Brown (1982) investigated the effect of one-to-three vs. one-to-one instructional arrangements on the response repertoires of three severely multihandicapped students. All three students, ages seven, eight and eight years, were nonambulatory with significant motoric, behavioral, and communicative difficulties. Data were collected on each student while they functioned under both instructional arrangements during forty-five snack sessions.

During one-to-one instruction, the teacher worked with each student consecutively, in a rotating fashion. Thus, each student received a fifteen minute session of direct one-to-one instruction. Upon completion of individual sessions, each student was wheeled to a leisure area, where he/she was expected to occupy the remaining portion of the snack period in a constructive manner. A familiar toy or game was placed within the reach of each child. Sessions were videotaped and overall measures were procured on the task-relevant and counterproductive responses made by each student during instructional portions as well as noninstructional free time portions.[5] During one-to-three instruction the teacher worked with students concurrently for the entire snack-period. Videotapes were also made of these sessions and the data analyzed according to task-relevant and counterproductive responses.

As might be expected, the instructional portions of the one-to-one sessions produced a slightly higher percentage of task-relevant responses. However, these positive effects were neutralized when the data from the noninstructional free time portions were included in the analysis.

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[5]A task-relevant response was defined as any attempt to perform the motoric actions necessary to complete the skills involved in "preparing a smoothie" a drinkable blend of milk, fruit and yogurt. Counterproductive responses were student-specific, and included finger-flicking, inappropriate manipulation of materials, inappropriate extension patterns and tongue thrusting.

In fact, when a comparison was made between the one-to-one instruction with free time and the one-to-three instruction, a greater number of task-relevant responses and fewer counterproductive responses were made by each student during the one-to-three arrangements. Thus it appears that the severely multihandicapped students involved in these case studies, who functioned in a class where the staff-to-student ratio did not afford one-to-one instruction for all students throughout the day and who did not have the skills necessary to make constructive use of free time, had more to gain when small group instruction was arranged.

Thus far the position presented in support of small group instruction has been based primarily on logistics. That is, given a limited staff-to-student ratio and students who seem to learn best through intense physical prompting procedures, small group instruction may allow for a greater number of task-relevant responses than one-to-one instruction. Certainly, there are other reasons for considering small group as a reasonable alternative to one-to-one instruction. First, one-to-one instruction does not allow for student-to-student interactions; whereas in a small group, a student could be taught peer interactions by, for example, "handing the towel to a peer" and "taking his/her turn on the 'Simon' game".

Second, one-to-one instruction does not provide opportunity for a student to learn to gain information by observing the actions of other students. Learning to rely on less direct input has far reaching educational implications. The more a student can function in response to cues provided by persons other than the teacher, the less restricted he/she is likely to be when functioning in nonschool and postschool environments.

Finally, when one-to-one arrangements predominate, there is little or no incentive to create teaching techniques that can be effective in small group arrangements. When the need to provide small group instruction is recognized, and teachers and therapists find themselves regularly facing two or three students instead of one, then new teaching strategies will be planned and instructional repertoires expanded.

C. Conditional Versus Unconditional Assistance

> A cup was placed in front of Sarah during snack break but not within her reach. While the teacher worked with another member of the group, Sarah reached for the cup. Following this unsuccessful attempt, Sarah looked toward the teacher, vocalized, and reached again for the cup. It was noted that these and subsequent attempts to solicit assistance were virtually unnoticed by the teacher. Sarah finally received the assistance needed when it was her "turn".

In the example above, the assistance provided was unconditional, that is, it was based on teacher determinations independent of student responses. How many attempts actually are made throughout the day by a severely multihandicapped student to act on an object or to initiate a particular skill? How many of these attempts are overlooked because of a failure to recognize partial responses? What happens over time

when attempts by a student to take greater control are not reinforced? In short, how much unconditional assistance results in "learned helplessness" (Seligman, 1975)?

Several strategies have been discussed which should set the stage for conditional assistance, that is, assistance which is based on student responses. First, contextual instruction must be considered. Here, the environment is structured to enable the student to become familiar with the conditions under which an activity is to occur. Familiarity often results in anticipation which should prompt more initiation or responses to natural rather than artificial cues (Falvey, Brown, Lyon, Baumgart & Schroeder, 1980).

Second, when a student has to share the attention of the teacher, it is highly probable that a greater number of responses to natural cues will be made. In the example of Sarah reaching for her cup, it was she who saw and made an attempt to reach for the cup (the natural cue) while the teacher was otherwise engaged. Thus, arranging small group instruction may provide context for a greater number of response initiations. However, at risk is that a student can quickly learn that no matter how many attempts he/she makes to secure a cup "It does not matter, because I will not be able to drink from it until the teacher decides that it is my turn." Therefore, to maximize the eliciting nature of the instructional setting, the teacher must be ready to reinforce the attempts by a student to become more independently active.

Third, if assistance is provided on a conditional basis, skills must be targeted and partial responses specified and reinforced during instruction. In the example of Sarah, if reaching and vocalization were targeted, the teacher might have deliberately placed the cup just out of her reach as eliciting action. Then, when Sarah made the desired response, the teacher would be more likely to reinforce her attempts.

D. Heterogeneous Versus Homogeneous Groupings

> After all the students arrived in their wheelchairs, Sarah was pushed down the hall to her locker...

Often severely handicapped students are grouped on the basis of a shared multihandicapping condition. It is common to see a classroom with seven severely handicapped students who are all nonambulatory, or all deaf/blind. One assumption is that students will benefit from placement with teachers who have acquired skills developed in direct response to a specific multihandicapping condition. For example, we assume that a teacher of students with physical disabilities has acquired techniques related to relaxing, positioning, transfering, adapting equipment and feeding that teachers of nonphysically disabled students may not possess. Similarly, we assume that a teacher of deaf blind students has acquired a repertoire of specialized techniques that are best suited to the communication and mobility needs of his/her students. However, in practice, we know that expertise in handling and positioning, for example, is student-specific and can be acquired once the student is in a teacher's care when the necessary consultative information is provided.

We also know that, in practice, many of the techniques used to present information to students with motor, sensorial and health-related difficulties require direct physical contact by the teacher. Imagine a teacher providing instruction on hair brushing to two severely physically handicapped students. Obviously, the number of occasions upon which the students can respond simultaneously is limited. Consider how much more efficiently this instruction could be carried out if one student in the group did not have severe motoric difficulties and could respond to verbal prompting, gesturing, modeling and minimal physical input. Similarly, a teacher may have several deaf/blind students in a group learning a tactile sign language system. While the teacher signs into the hands of one student, the other deaf/blind students receive no information. It would be more efficacious for a deaf/blind student to learn in a group with students who rely on a less direct mode of communication. This would allow the teacher to provide tactile information to the deaf/blind student, and verbal or visual information to the others.

Furthermore, the variety of interactions that occur between peers with similar handicapping conditions cannot possibly compare to that which is possible when a severely multihandicapped student is grouped with students who do not have a similar degree of physical, sensorial or health-related difficulty.

On the other hand, students functioning in heterogeneous groupings can learn to complement each other's abilities. Consider the following examples:

> A blind, nonambulatory severely handicapped student is positioned in line at McDonald's with a sighted, able-bodied peer. The blind, nonambulatory student drops her wallet and her peer recovers it for her.
>
> At a vocational site, an able-bodied student collates six informational sheets while a physically handicapped student uses an adapted electric stapler to complete the task.
>
> In a domestic site, a nonambulatory severely handicapped student loads the dishwasher, and an ambulatory student operates the dials and puts the dishes in the cupboards when they are dry.

Finally, imagine providing instruction to two nonambulatory students at a local grocery store. Imagine, further, the reactions of nonhandicapped shoppers who, upon viewing the wheelchair blockade in Aisle 10, decide to move to another area of the store that is less "crowded". Certainly, a one-to-two staff-to-student ratio is reasonable, but here, the homogeneity of the group brought undesirable attention to their presence. Instead, one student in a wheelchair might receive instruction with an ambulatory student, resulting in "less crowded" appearance.

E. Predictable Versus Unpredictable Features of the Schedule and Structural Arrangement

> Many times Sarah was pushed in her chair with no information provided to let her know who was pushing her, where she was going and for what reasons... At no time could Sarah anticipate the skills that were to be required of her next. Some days she worked on brushing her hair... Yet, other days...

One sure way to minimize the active responding of any student is to structure daily events such that few or no predictions can be made. This seems to be especially true for students who have limited response repertoires. If the underlying goal of an activity is to elicit more active responses, then instruction must be arranged so that a student can learn to recognize familiar features of the schedule and environment and anticipate the responses required based on previously established associations.

At least three variables must be addressed when attempting to establish greater predictability; the structural features of the environment; the schedule of activities; and the staff-to-student assignments.

The structural features of the environment. When a student receives routine instruction in a nonschool environment, he/she learns to draw upon the salient features of that environment to predict the nature of the responses that will be required. Oftentimes a student develops a strong association between the environment and the responses required without direct instruction from the teacher. Such was the case with Jim, a deaf/blind severely multihandicapped student, who received vocational instruction at the Veteran's Administration Hospital. After several months of training, Jim acquired the skills necessary to locate the outpatient area of the hospital, organize his materials and perform the task of packaging potassium packets. At one point, his teacher decided to bring some of the materials back to school so that Jim could receive additional training to increase his rate on the packaging task. At school, Jim repeatedly refused to perform the skills which he had successfully demonstrated at the hospital. Whereas this overselective responding may be viewed negatively in other situations, it was viewed positively in this context. Jim had clearly made the association between the work environment and the responses appropriate to that environment. Thus the teacher decided not to pursue this vocational instruction in the unfamiliar and artificial context (in the school environment).

Students may actually find it easier to predict the actions required in nonschool environments. Restaurants, streets, stores, bowling alleys, etc. all have unique features that can be readily recognized and thus responses required within those settings become more predictable. But what about the school environment? To what extent can a young severely multihandicapped student draw upon the features that exist within

a classroom to predict which responses are required? Can the structural features of the classroom be arranged to elicit more active responding? Below is a list of questions that a teacher might ask when planning the structural arrangement of the room:

1. Do the materials located in each area of the room communicate the nature of the activities that occur there? For example, the free time area is carpeted, has bean bag chairs, a record player, radio, games.

2. Are the materials placed in such a way so that students have ready access to them? For example, in the changing room, which is located next to the bathroom down the hall, the diapers are stacked on a shelf in such a way that a student can learn to reach for one as a part of the changing routine.

3. Does the student go to a specific area of the room or school each and every time he/she is expected to perform specific skills? For example, a student always receives instruction on "putting on and taking off her jacket" in front of her locker.

The schedule of activities. Scheduling of activities can also have an impact on the responses made by severely multihandicapped students. Frederiksen and Frederiksen (1977) evaluated the effects of scheduling activities in a predictable (fixed) versus unpredictable (random) sequence with severely handicapped students. They found that random scheduling resulted in lower levels of task completion for ten of the eleven students studied. Thus, to establish greater predictability, a relatively fixed sequence of activities was recommended.

For severely multihandicapped students, we might seriously consider maintaining a predictable order of events until the student actively participates at an acceptable performance criteria. Furthermore, it is important that the order of activities represents that which might logically or naturally occur across a variety of settings. For example, a logical time for Sarah to receive instruction on brushing her teeth is after a lunch.

Staff-to-Student Assignments. Another variable that might be manipulated to establish greater predictability in a schedule is staff-to-student assignments. Oftentimes, staff-to-student assignments are made in an impromptu manner. Instructions are given freely, such as "Janet, (the instructional aide), please take Joel to the bathroom, and I'll work with Sue at her locker." Because Janet has not provided Joel with instruction on his bathrooming routine for quite some time, she is not able to emphasize the skills that have been targeted for Joel. As a consequence, Joel becomes unsure of the expectations and his response level decreases.

When the staff-to-student assignments are planned, all students can be accounted for. For example, the instructional aide can be assigned to two students for the bathrooming routine. Plans can be written by

the teacher and reviewed by the aide in advance. Methods can then be developed to ensure that both students receive instruction simultaneously and that plans are being followed effectively. Furthermore, through systematic data collection, progress can be analyzed and student-based decisions can be made pertaining to the most appropriate time to vary the staff-to-student assignment, grouping patterns, materials, etc.

The following procedures were used to generate a schedule for the class once the environments and activities relevant for each student were identified during the IEP process.

1. Using baseline data, chart the time during the day and anticipated duration of the following activities and schedule accordingly:

   a. Bathroom usage;
   b. Mealtime;
   c. Positioning requirements; and
   d. Bus arrival and departure times.

2. Next, schedule the least flexible activities and environments:

   a. Nonschool sites; and
   b. Activities that involve specialized personnel (e.g., recess, art, music, physical education, IMC).

3. Schedule larger blocks of time, planning for the time needed to initiate, prepare for, participate in, and terminate an activity by:

   a. Accounting for the most natural times during which an activity is likely to be engaged in (e.g., brushing teeth following a meal); and
   b. Account for the establishment of a routine so that students can learn to predict "What's next?"

4. Devise groups and make staff-to-student assignments.

5. Continue to evaluate and revise schedule in order to:

   a. Minimize "dead time";
   b. Maximize instruction by aides, student teachers, related service personnel, etc.;
   c. Maximize social interactions between students; and
   d. Provide longitudinal and challenging learning experiences to all students.

## V. SUMMARY

The general educational goal for severely multihandicapped students is not significantly different from that of their nonhandicapped or less-handicapped peers, that is, to acquire the skills that will enable greater access to a variety of environments. The degree to which a severely multihandicapped student learns to access, or become actively involved in, a particular environment is highly dependent on the efforts of teachers, parents and other persons in educational capacities. We have presented a series of strategies which have been designed to elicit active student participation. These strategies represent some of our best attempts to achieve an understanding of how interventions might lead to a more challenging learning environment for students whose limited response repertoires are far too often attributed to their multihandicapping conditions rather than lack of teacher ingenuity.

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## APPENDIX A

## PARENT PARTICIPATION GUIDE

The purpose of this guide is to obtain information that can be used to facilitate an on-going discussion of the curricular content that is most reflective of your child's individual needs. Any input that you can provide regarding personal observations of your child, the types of activities in which you would like to see your child engage, future plans for your child, etc. would be considered a valuable contribution to the planning stages of your child's Individualized Education Program (IEP). Since this guide is designed to secure information about students whose ages range from five through twenty-one years, some of the content may not be applicable to your situation.

This guide is divided into three major sections. Section I is entitled, "Family Characteristics: Present and Future." Section II is entitled, "Activities of Typical Weekday and Weekend" and Section III is entitled, "A Parent Attitudinal Checklist."

Name of Student _____ Date: _____

Name of Parent(s) or Primary Caregiver(s) completing this questionnaire:

_____

_____

## SECTION I

## FAMILY CHARACTERISTICS: PRESENT AND FUTURE

A. Family Characteristics: Present

1. Number of persons who live at home with the child of concern: ___

2. Please list the first name of each person who lives at home with the child of concern, his/her relationship to the child, and age. Please note if this person is handicapped and the nature of the handicapping condition.

| First Name | Relationship to Child | Age | If this person is handicapped, please describe the nature of the handicapping condition |
|---|---|---|---|
| | | | |

3. Are there other persons who spend a significant amount of time with your child? If so, please identify them in the remaining space above.

B. Family Characteristics: Future

1. What type of living arrangement do you foresee for your child as he/she reaches adulthood? (Some options might include a small group home with 5-8 individuals; a cluster of homes; an apartment; a large residential facility.)

2. Please describe the level and/or type of supervision that you think your child might need in adulthood.

## SECTION II

## ACTIVITIES OF A TYPICAL WEEKDAY AND WEEKEND

### A. Typical Weekday and Weekend Schedules

Please record on the following schedules the places, activities and persons that characterize the before and after school hours and weekend life space of your child.

1. A Weekday Schedule of Before School Hours  Date _____

| Time | Place | Activity | Persons Involved |
|---|---|---|---|
| | | (Please describe the morning routine) | |

2. A Weekday Schedule of After School Hours Date _____

| Time | Place | Activity | Persons Involved |
|---|---|---|---|
| 3:30 pm | | | |
| 4:00 pm | | | |
| 4:30 pm | | | |
| 5:00 pm | | | |
| 5:30 pm | | | |
| 6:00 pm | | | |
| 6:30 pm | | | |
| 7:00 pm | | | |
| 7:30 pm | | | |
| 8:00 pm | | | |
| 8:30 pm | | | |
| 9:00 pm | | | |
| 9:30 pm | | | |
| 10:00 pm | | | |

3. A Weekend Schedule for Saturday Date: _____

| Time | Place | Activity | Persons Involved |
|---|---|---|---|
| _____ | | Gets out of bed | |
| | | _____ | |
| | | _____ | |
| _____ | | Eats breakfast | |
| | | _____ | |
| | | _____ | |
| _____ | | Eats lunch | |
| | | _____ | |
| | | _____ | |
| _____ | | Eats dinner | |
| | | _____ | |
| | | _____ | |

4. A Weekend Schedule for Sunday

Date: _____

| Time | Place | Activity | Persons Involved |
|---|---|---|---|
| _____ | | Gets out of bed | |
| | | _____ | |
| | | _____ | |
| _____ | | Eats breakfast | |
| | | _____ | |
| | | _____ | |
| _____ | | Eats lunch | |
| | | _____ | |
| | | _____ | |
| _____ | | Eats dinner | |
| | | _____ | |
| | | _____ | |

5. Please list other activities in which your child typically engages which are not represented on the "Weekday and Weekend Schedules."

| Place | Activity | Approximate Number of Times Per Month Your Child Engages in the Activity |
|---|---|---|
| | | |

## SECTION III

## A PARENT ATTITUDINAL CHECKLIST

### A. Parent Attitudinal Checklist

The information that you have recorded on the schedules should be helpful when discussing student needs that could be addressed in an IEP.

To expand on this information, a checklist is presented on the following pages. It includes many of the activities that you might have listed on the schedules as well as other activities in which your child might be engaged in the future. Please check the appropriate box(es) to indicate the response that best describes your feelings:

This activity is very frustrating for me and/or for my child;

It is much easier, and always will be easier, if I do this activity for my child;

If the school would work on this activity, I would try to involve my child in the activity, even if he/she could not do it independently; and/or

I would like to see this activity included in my child's IEP.

## PARENT ATTITUDINAL CHECKLIST

| ACTIVITIES<br>HOME | This activity is very frustrating: for me | for my child | It is much easier, and always will be easier, if I do this activity for my child. | I would like to see this activity included in my child's IEP. | If the school would work on the activity, I would try to involve my child in the activity, even if he/she could not do it independently. |
|---|---|---|---|---|---|
| Self-Care | | | | | |
| Undressing | | | | | |
| Dressing | | | | | |
| Bathing | | | | | |
| Washing face and hands | | | | | |
| Caring for teeth | | | | | |
| Brushing hair | | | | | |
| Bathrooming | | | | | |
| Caring for nails | | | | | |
| Household Tasks: | | | | | |
| Making bed | | | | | |
| Picking up clothes | | | | | |
| Picking up games | | | | | |
| Mealtime: | | | | | |
| Preparing a snack | | | | | |
| Preparing a meal (breakfast, lunch, supper) | | | | | |
| Setting table | | | | | |
| Eating | | | | | |
| Drinking | | | | | |

PARENT ATTITUDINAL CHECKLIST

(Continued)

| ACTIVITIES | This activity is very frustrating: for me | for my child | It is much easier, and always will be easier, if I do this activity for my child. | I would like to see this activity included in my child's IEP. | If the school would work on the activity, I would try to involve my child in the activity, even if he/she could not do it independently. |
|---|---|---|---|---|---|
| Mealtime (continued) Using napkin | | | | | |
| Cleaning table | | | | | |
| Washing dishes | | | | | |
| Drying dishes | | | | | |
| Putting away dishes | | | | | |
| Cleaning wheelchair tray | | | | | |
| Recreation: (Indoor) Watch T.V. | | | | | |
| Listen to records | | | | | |
| Looking at magazines | | | | | |
| Playing with a game/toy | | | | | |
| Recreation: (Outdoor) Rolling a ball | | | | | |
| Taking a walk | | | | | |
| Engaging in activities with friends | | | | | |
| Other | | | | | |
| | | | | | |
| | | | | | |

## PARENT ATTITUDINAL CHECKLIST

(Continued)

| ACTIVITIES | This activity is very frustrating: for me | for my child | It is much easier, and always will be easier, if I do this activity for my child. | I would like to see this activity included in my child's IEP. | If the school would work on the activity, I would try to involve my child in the activity, even if he/she could not do it independently. |
|---|---|---|---|---|---|
| COMMUNITY | | | | | |
| Browsing in department store | | | | | |
| Grocery shopping | | | | | |
| Riding the elderly & handicapped bus | | | | | |
| Riding in a car | | | | | |
| Going to the park | | | | | |
| Going to the zoo | | | | | |
| Going to the lake | | | | | |
| Going to the bowling alley | | | | | |
| Going to the arcade | | | | | |
| Going to church/ synagogue | | | | | |
| Eating in a restaurant | | | | | |
| Swimming | | | | | |
| Other | | | | | |

PARENT ATTITUDINAL CHECKLIST

(Continued)

| ACTIVITIES | I can see my child engaged in this type of activity in adulthood, even though he/she may not do it independently. | I would like to see an activity like this included in the IEP. |
|---|---|---|
| VOCATIONAL | | |
| Labeling boxes at UW Hospital | | |
| Folding towels at Howard Johnson's | | |
| Packaging, pricing and stocking grocery items at Concordance Natural Food Store | | |
| Collating and stapling materials at Wilson State Office Building | | |
| Opening and washing pharmacy supplies at VA Hospital | | |
| Other | | |
| Please use this space tc add any other information that you feel should be considered in the IEP process | | |

## APPENDIX B

### An Ecological Inventory of "Operating a Thundervette Remote Control Car"

Domain: Recreation/Leisure

Environments: School and Home

Activity: Operating a "Thundervette" Remote Control Car

Skills:

1. Positions self in front of toy shelf
2. Reaches for car from an array of four toys
3. Picks up car and places it on the floor
4. Picks up control handle and places it on the floor
5. Positions remote control handle in hand
6. Holds handle so buttons are facing body
7. Uses full grasp around handle (foam padding has been placed around handle to enable a better grasp)
   a) Places palm on right side of handle
   b) Wraps fingers around outside of handle
8. Places thumb at first knuckle
9. Bends thumb at first knuckle
10. Pushes down on button
11. Maintains pressure on button
12. Tracks car as it moves forward
13. Releases button to stop the car when the car reaches the end of the wire:
    a) Straightens thumb
    b) Places thumb on outside of control handle
14. Moves thumb to other button on right
15. Lifts thumb up to button
16. Bends thumb at first knuckle
17. Pushes down on button
18. Maintains pressure on button
19. Tracks car as it moves backward
20. Releases button to stop car when the car reaches end of wire

21. Repeats and varies car paths
22. Positions self with car in front of toy shelf
23. Picks up car and places on shelf
24. Picks up control handle and places on shelf